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ABSTRACT

The findings from content studies of three Graduate Record Examination (GRE) Advanced Tests: Biology, Literature in English, and Political Science were reported. The studies were designed to indicate the degree to which content specified for and included in test forms for these fields is representative of the content actually taught in the undergraduate curricula in the fields. The studies provided useful information concerning the content representativeness of the tests. The technique for assessing content representativeness was informed judgments. Groups of college faculty knowledgeable in curricula practices at the undergraduate level were asked to make judgments about the relationship between curriculum and test content by examining test items and content specifications for the tests. An assessment of the relevance of test content to understand graduate curricula was obtained by inference. The content of each of the tests was found generally representative of the content of the respective undergraduate curricula. However, some differences of opinion were found among the respondents in the Biology and Political Science studies as to the degree of emphasis that should be given to certain subareas of the content.
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GRE

GRADUATE RECORD EXAMINATIONS

REPORT OF A STUDY OF THE CONTENT OF THREE GRE ADVANCED TESTS

Richard DeVore
and
Miles McPeck

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Report of a Study of the Content
of Three GRE Advanced Tests

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ABSTRACT

This paper reports the findings from content studies of three GRE Advanced Tests: Biology, Literature in English, and Political Science. The studies were designed to indicate the degree to which the content specified for and included in recent test forms for these fields is representative of the content actually taught in the undergraduate curricula in the fields. The studies provided substantively useful information concerning the content representativeness of the tests.

Informed judgments were relied on as the technique for assessing the representativeness of the content. Groups of college and university faculty knowledgeable in curricular practices at the undergraduate level were asked to make judgments about the relationship between curriculum and test content by examining both individual test questions and the content specifications for the tests. By inference, within the error limits of the judgments, an assessment of the relevance of test content to undergraduate curricula was obtained.

Although the studies supply evidence that the content of each of the tests generally is representative of the content of the respective undergraduate curricula, modest differences of opinion were found among the respondents in the Biology and Political Science studies as to the degree of emphasis that should be given to certain subareas of the content.

A STUDY OF THE CONTENT

OF

THREE GRE ADVANCED TESTS

1. Introduction

The GRE Aptitude Test and Advanced Tests are measures developed to aid prospective graduate students and institutions in the applications and admissions process. The Aptitude Test taps the ability to reason with words, mathematical concepts, and other abstractions. Thus, it reflects skills that have developed over long periods of time and are not tied to specific fields of study. In contrast, the Advanced Tests focus on the measurement of learning in 20 separate disciplines. Their usefulness in the admissions process is based upon the relationship of achievement at the undergraduate level to future achievement in graduate school, a relationship that has been confirmed by research.

Since the meaning of course grades or faculty recommendations differs among institutions, and often among faculty within institutions, common measures of undergraduate achievement, such as those provided by the GRE Advanced Tests, are needed. Therefore, each test attempts to focus on topics to which the majority of students in a field have been exposed, especially those students planning further graduate study. Since many fields incorporate a wide variety of subtopics, and since informed opinion differs widely regarding the relative importance of these subtopics, the task of constructing a measure whose content coverage will be appropriate for large numbers of examinees is not an easy one. Several approaches are followed in an effort to identify a core of knowledge in each subject area that will be common to most examinees. The test development process is guided by Committees of Examiners, whose members are experts in their disciplines. Students taking the tests are surveyed to determine their experience in various courses and their career goals. This was done most recently in 1978-79. Examinees' performance data on the test questions are examined, and the content of the most difficult questions is reappraised in terms of its appropriateness for inclusion in the test. Graduate deans or department chairpersons requesting inspection copies of the tests are asked to supply written review comments. These reviews and letters from students concerning test content are brought to the attention of test specialists and committee members.

Although these various techniques are employed to ensure that each Advanced Test accurately reflects important aspects of typical curricular offerings, it is nevertheless advisable to assess the success of these efforts periodically. This study examines the relationships between test content and undergraduate curricula of three GRE Advanced Tests: Biology, Literature in English, and Political Science. The study is intended to serve as a model for succeeding studies of the remaining Advanced Tests.

With this in mind, the above three tests were selected to represent very different curriculum areas and a resulting variety of problems in the investigation of content representativeness.

Content Representativeness

The GRE Advanced Tests are designed to help graduate school committees and fellowship sponsors assess the qualifications of applicants for advanced study and for fellowships and to help students assess their own qualifications in their fields. The tests should present the material encountered by most undergraduate majors as well as measure the knowledge, understanding, and skills considered important for graduate study. This broad scope of the GRE Advanced Tests has implications for the assessment of their content representativeness. If a test is intended to measure achievement in a specific course, introductory psychology for example, then a review of the content of the most popular text books for such a course seems an efficient way of assessing content representativeness. Since the scope of any of the Advanced Tests is the entire undergraduate curriculum in a subject, that sort of an approach is much less appropriate.

This study relies on informed judgments as the technique for assessing the representativeness of test content. Groups of college and university faculty knowledgeable in curricular practices at the undergraduate level were asked to make judgments about the relationship between curriculum and test content by examining (a) the content specifications for the tests, and (b) individual test questions. These judgments yielded information concerning two aspects of the three GRE Advanced Tests:

1. The degree to which respondents judge the content categories of the test to be representative of the curriculum of the undergraduates at their institutions who intend to pursue graduate study
2. Judgments about the content category classifications of test items

By inference, within the error limits in both sets of judgments, an assessment of the relevance of test content to undergraduate curricula was obtained. These results provide a valuable additional source of information for the three Advanced Test Committees of Examiners and an additional aspect of quality assurance for the tests.

2. Test Specifications and Committees

Test specifications are the blueprints of the test development process, usually containing all the information necessary to guide preparation of the desired final product. Ideally, test specifications should be precise and inclusive enough that test assemblers working independently from the same specifications could generate tests that would be equivalent to each other.

Complete test specifications include the desired distribution of subject content to be measured, the desired statistical attributes, the types of questions proposed for use, the proposed timing for administration of the test, and a statement of the purpose for which the test is intended. Each GRE Advanced Test is designed to be an achievement test through which a potential graduate student can demonstrate his or her command of the subject matter in a particular field considered prerequisite for success in graduate study. It follows, then, that the content assessed in the test should accurately reflect the content considered by those in the field to be the aforementioned prerequisite subject matter.

The specifications for each GRE Advanced Test are developed by the Committee of Examiners for that test. The members of the committee are appointed to serve for renewable two-year terms. They are experts in their field, selected from college and university faculties by ETS staff in consultation with the nominees' field-related professional societies. In appointing committee members, the GRE program and test development staffs attempt to provide representation over several variables including sex, ethnic background, region, and school type and size. If the field is fractionated, representatives are sought from the various subfields. The assembled Committee of Examiners, and its knowledge of the field and education in the field, therefore, is the primary resource upon which development of specifications depends. From time to time, the committee may request that surveys be undertaken to provide them with additional information about curricula in their field. In addition, department heads and deans are encouraged to review the tests and to comment on their makeup.

It is typical for committee members to serve on the Committee of Examiners for from four to eight years. Their replacement on a regular basis by other experts in the field helps to assure that a variety of points of view are considered and to keep the test abreast of changes in the field. At the same time, it is important that test specifications evolve slowly so that test forms in use at the same time are parallel enough in content for scores to be comparable.

Professional subject-matter and measurement specialists on the staff of ETS assist the Committee of Examiners. These test specialists provide information and advice about methods of test construction, help with the preparation of questions and tests, and generally aid the committee with its work.

In this study an attempt was made to determine whether the tests under consideration actually measure the content they are designed to measure, namely the content identified in the specifications for the tests, and to substantiate that the content identified for testing in the specifications actually represents the content taught in undergraduate curricula in the particular fields.

3. Procedures Followed in the Study

Although certain aspects of the study in each of the three content areas differed, the studies generally followed a predetermined format. Each test specialist drew up a list of criteria he or she felt should be used in selecting institutions to be invited to participate in the study. These criteria included size, location, and reputation of the institutions, composition of the student body, existence or absence of graduate programs, and type of control, i.e., public or private. By selecting institutions on the basis of these various characteristics, it was hoped that they would reflect the different curricula in use in the United States. Using these criteria, the test specialists identified the institutions they would invite to participate in the study and, when possible, asked their test committees to review the selection and recommend changes or additions. The lists of criteria and institutions selected were confirmed by the project director, project coordinator, and the GRE Program staff.

A letter of invitation, based on a model developed by the project coordinator, was forwarded to the chairperson of the appropriate department of each institution identified. The letter described the study, indicated what would be required of participants, and alerted the chairpersons to expect a phone call from ETS to ascertain their interest or disinterest in participating. The chairpersons were asked, if they elected to participate, to name a member of their departments who would complete the questionnaires for the study.

It was decided at the outset of the project that participation of the appropriate departments at 30 institutions would be sufficient to provide a sample with a variety of different characteristics and manageable data collection costs. Since a low response rate was anticipated, each of the test specialists assigned to the project was advised to contact the appropriate departments at at least 40 institutions, and more if possible, in the hope of obtaining the participation of the requisite number of 30. Accordingly, the appropriate departments at 40 institutions were contacted for Political Science, 50 for Literature in English, and 55 for Biology.

Phone calls were made and respondents were identified. Three questionnaires were sent to each respondent; samples of these forms appear in Appendix A. The first questionnaire asked the respondents to indicate the importance their department attached to topics in the GRE Advanced Test specifications in their undergraduate curricula leading to graduate study and to rank the topics according to the importance of each in their curricula. Respondents were also asked to indicate topics emphasized by their curricula, that were not included in the GRE test specifications. The second questionnaire asked the respondents to classify a set of questions from a recent form of the test according to the content topics included in the specifications. The tests were divided by the test specialists into several sets of questions, and specific assignments were given to respondents so that all questions in one test form would be classified but no one would have to classify all the questions unless he or she chose to do so. The third questionnaire asked for background information about the respondent and his or her institution.

Of the 40 departments contacted for the Political Science study, 32 (80%) agreed to participate and all of these actually completed and returned their questionnaires. Thus, the 33 percent overage in the selection of institutions was justified in this instance. The high response rate in the other two subjects studied was unanticipated.

Of the 50 departments contacted for the Literature in English study, 47 (94%) agreed to participate and of these 43 (92%) actually completed and submitted their questionnaires. The Biology study also experienced a substantial response. Of the 55 departments contacted, 53 (96%) agreed to participate and 48 of these (91%) completed and returned the questionnaires. The parent institutions of the departments that participated in each of the studies are listed in Appendix B.

The data collected via these questionnaires were tabulated and analyzed by the test specialist conducting each study. Detailed analyses were shared with the appropriate Committee of Examiners. A summary of these analyses is presented in the following section of this report.

4. Test Study Results

The Advanced Biology Test Study

Because the current specifications for the Advanced Biology Test include only three main content areas, the Committee of Examiners for this test devised a subdivision of these areas in the hope that the greater specificity would result in more information about undergraduate curricula, and that the added information would help the committee to restructure the specifications. To provide guidance to the respondents in the study, the subcategories were carefully described. This subdivision of the content areas generated responses that will be useful to the committee in its plan to restructure specifications, but it also created some difficulties because the new categories do not map directly into the original three areas on a one-to-one basis. For instance, one of the new categories was called "developmental and comparative biology," and the topic of genetics was assigned by definition to this category. Under the original specifications, genetics questions could quite appropriately have been classified in any of the three main content areas. The respondents recognized such overlap and often classified questions in several categories rather than in the ones specifically defined and described by the committee to include the topics.

It can be argued that the breakdown of the content categories used in this study is an appropriate way to describe the test and that the test specialists' classification of questions, done on the basis of the category descriptions, provides an approximation of what the Committee of Examiners would have done if they had been asked to reclassify questions. If this view is accepted, then evidence for the degree to which the content of the test parallels the content taught in undergraduate curricula is provided by the extent to which the respondents agreed that the content defined by

the breakdown is appropriate and that the questions are appropriately classified under this breakdown. The data that follow are based upon the subdivision of the actual specifications used to create the test, and thus they do provide evidence for the content representativeness of the Advanced Biology Test.

The data gathered through the first questionnaire were intended to determine whether the respondents felt that the content topics used to define the test were important parts of their undergraduate curricula. Table 1 indicates the respondents' judgments as to the importance of the content topics in their curricula.

Table 1: Respondents' ratings of importance of content categories in undergraduate biological sciences curricula (N=48)

	Very or Moderately Important	Minimally Important or Unimportant
I Molecular-Subcellular Biology	96%	4%
II Cellular Biology	100%	0%
III Physiology and Morphology	89%	11%
IV Developmental and Comparative Biology	86%	14%
V Environment	82%	18%
VI Evolution	72%	28%

It is clear from this table that the majority of the respondents considered all six of the content divisions to be important parts of undergraduate curricula in the biological sciences.

The respondents were also asked in the first questionnaire to rank the content categories on a scale from 1 (most important) to 6 (least important) according to the importance of the topic in the undergraduate curriculum. The respondents' rankings are recorded in Table 2. The average rank score was computed by multiplying the number of respondents choosing each rank for a particular topic by the rank, summing these products across a topic, and dividing by the number of respondents. The lower the average rank score is, the more importance the respondents attached to the category.

Table 2:

Summary of rank ordering of content categories according to their importance in undergraduate biological sciences curricula - Number of respondents choosing each rank

Content Categories	1 (Most Important)	2	3	4	Rank 5	6 (Least Important)	Average Rank Score	Number of Respondents
I Molecular-Sub-cellular Biology	17	9	5	4	7	3	2.6	45
II Cellular Biology	12	17	8	6	2	0	2.3	45
III Physiology and Morphology	13	11	6	3	3	4	2.6	40
IV Developmental and Comparative Biology	3	7	9	11	11	4	3.7	45
V Environment	5	4	10	8	10	7	3.8	44
VI Evolution	3	3	5	4	9	23	4.7	47

These data indicate that roughly equivalent emphasis should be given to the first three content topics and this should be greater than that given to the last three topics. Topics IV and V should receive roughly equivalent coverage, and topic VI should receive the least emphasis.

The average rank scores in Table 2 represent the average response of a widely diverse group of respondents as to the emphasis actually given to each of the six content categories covered by the GRE Advanced Biology test. Several similar analyses of the data were made to determine whether these responses were consistent across various subgroups represented in the sample. These analysis contrasted the responses of the following subgroups:

1. Respondents identifying themselves as cellular biologists vs those identifying themselves as organismal biologists
2. Respondents having less than 15 years of teaching experience vs those having 15 or more years of teaching experience
3. Respondents from institutions with student bodies of less than 10,000 vs those from institutions with student bodies of 10,000 or more
4. Respondents teaching at institutions with undergraduate programs only vs those teaching at institutions with both undergraduate and graduate programs
5. Respondents from institutions in the Northeast vs those from institutions in the Midwest vs those from institutions in the South vs those from institutions in the West

Each of the subgroups studied provided essentially the same rank ordering of the content categories as the total sample described above. Moreover, the specific average rank scores for the various categories were remarkably similar across subgroups for all contrasts. In order to demonstrate this consistency, the results of the subanalysis contrasting the various regions of the country are reported in Table 3. These data are reported because the differences in the average rank scores for the subgroups in this contrast were greater than those in any of the other contrasts. Although the subsample sizes are small, this and the other contrasts support the data in the analysis of the total group and suggest that the emphasis given to the various content topics in undergraduate curricula is reasonably consistent and independent of characteristics of the respondents or institutions they represent.

Table 3: Summary of rank ordering of biological content categories according to their importance in undergraduate curricula - Average rank scores by region.

Content Categories	Region	Rank Score	Number of Respondents
I. Molecular- Subcellular Biology	NE	2.2	10
	MW	2.6	12
	S	2.8	10
	W	3.3	8
II. Cellular Biology	NE	2.3	10
	MW	2.3	12
	S	2.2	10
	W	2.7	8
III. Physiology and Morphology	NE	3.2	10
	MW	2.8	12
	S	2.4	10
	W	3.2	8
IV. Developmental and Comparative Biology	NE	4.5	10
	MW	3.8	12
	S	3.7	10
	W	3.6	8
V. Environment	NE	4.2	10
	MW	3.8	12
	S	4.4	10
	W	4.2	8
VI. Evolution	NE	4.7	10
	MW	5.8	12
	S	5.5	10
	W	4.1	8

The first questionnaire in the Advanced Biology Test study also included a question asking respondents to indicate the percentage of the test they felt should be devoted to testing each of the six topics and the percentage they felt should be devoted to other topics they believed to be important in order to properly assess the curriculum at their institution. The data from this question are summarized in column 1 of Table 4.

The figures recorded in the second column of Table 4 are derived from the data obtained with the second questionnaire, which was intended to indicate the amount of agreement on the classification of individual questions according to the content topics in the specifications. They are derived by assigning a question to a content category if 50 percent or more of the respondents believed it belonged in that category. (The percentages in this column do not sum to 100 percent because, for some questions, no category received 50 percent or more of the respondents' votes.) The data in column 2 are based upon a maximum of 21 respondents per question.

Table 4:

Percentages of questions on content topics in an Advanced Biology Test

	Modal Percentages of Content Emphasis Suggested by Respondents	Percentages Based on Respondents' Classification of Questions
I. Molecular-Subcellular Biology	6-10%, 16-20% (bimodal)	18%
II. Cellular Biology	16-20%	13%
III. Physiology and Morphology	16-20%	31%
IV. Developmental and Comparative Biology	11-15%	8%
V. Environment	6-10%	12%
VI. Evolution	6-10%	7%

The data in Table 4 permit a comparison of the emphasis on content topics that the respondents would like to see in the test with the emphasis they believed was actually present in the test form for which they provided question classifications. The match is reasonably accurate with respect to all the categories except physiology and morphology, which is overrepresented, and developmental and comparative biology, which is underrepresented. This finding is encouraging evidence that the content of the test represents that actually being taught in the respondents' undergraduate curricula.

It should be noted that the content emphasis suggested by the respondents (Table 4) does not match that indicated by the average rank score (Table 2) for each content topic. This disparity can be attributed to the fact that the average rank score was derived from a questionnaire on which the respondents were asked to rank topics on a scale from 1 to 6 and to use a ranking only once. Many respondents felt that this forced ranking inaccurately reflected the importance of the topics because it did not allow for equal rankings of two or more topics. Thus, the emphasis suggested as a free response and reported in Table 4 is believed to represent the actual curricula more accurately and was used above in the assessment of content representativeness.

The data from the first questionnaire indicate that no other topics were judged as important as the topics used in the study by any group of respondents, lending credence to the assumption that the topics used in the study included those deemed most important by the respondents as a group.

It is clear that the content representativeness of the test rests primarily on the degree of agreement between the percentages for each content category suggested by the respondents to match the curriculum and the percentages of test questions in each category as judged by the respondents. For most test editions, which are not subjected to a study such as this one, only the classifications of test questions by content categories as judged by the Committee of Examiners and/or the test specialists are available. The test specialists are professional staff members of ETS, educated in the discipline of the test, who work with the Committee of Examiners in developing the test. For the Biology Test edition that was the subject of this study, the classification of test questions by content categories as judged by the two test specialists is available. It is instructive to see what degree of agreement there is between the classification of test questions by the test specialists and the classification of test questions by the respondents. The data are given in Table 5.

Table 5: Comparison of test specialists' content classification of questions with that provided by respondents.

Content Category	Percentage of questions for which 50% or more of the respondents agreed with the test specialists' classification
I. Molecular-Subcellular Biology	69%
II. Cellular Biology	68%
III. Physiology and Morphology	87%
IV. Developmental and Comparative Biology	25%
V. Environment	80%
VI. Evolution	48%

These data indicate that in four categories, the majority of the respondents agreed with the test specialists' categorization. In two categories the agreement was poor and is believed to reflect the overlap between content areas described earlier. The Committee of Examiners intends to revise the current test specifications for the Advanced Biology Test, using information gathered in this report, a step that may improve the specificity of content categories.

The Advanced Literature in English Test Study

The Advanced Literature in English Test study provides abundant evidence that the test is representative of the content covered in undergraduate curricula within the limitations of the study described in the last section of this report. The first questionnaire was designed to assess the importance in undergraduate curricula of the content topics used in assembling this test. The data in Table 6 indicate that the majority of the respondents believed the major content topics were quite important in their undergraduate curricula.

Table 6: Importance of content categories in preparation for graduate study in literature

<u>Topic</u>	<u>Very or Moderately Important</u>	<u>Minimally Important or Unimportant</u>
I. Continental, Classical, and Comparative Literature	56%	44%
II. Literature to 1660	100%	0%
III. English Literature 1660-1914	100%	0%
IV. American Literature before World War I	95%	5%
V. British and American Literature Since 1914	95%	5%

Number of Respondents = 43

These data reveal that four of the five topics tested in the Advanced Literature in English Test are judged to be important in the respondents' undergraduate curricula leading to graduate study. Continental, classical, and comparative literature is judged to be important by only about half of the respondents, and although only 2 percent of the respondents thought this topic was unimportant, 42 percent believed it to be of minimal importance.

The respondents were also asked in the first questionnaire to rank the topics on a scale from 1 (most important) to 5 (least important) according to the importance of the topics in the respondents' curricula.

By multiplying the number of respondents choosing each rank for a particular topic by the rank, summing these products across a topic, and dividing by the number of respondents, an average rank score can be generated for each topic, providing an index of the relative importance assigned to each topic. Table 7 presents the ranking by content topic and the average rank scores derived from them. The lower the average rank score for a topic, the more important the topic was considered to be by the respondents.

Table 7: Summary of rank ordering of content categories according to their importance in undergraduate English literature curricula - Number of respondents choosing each rank

Content Categories	Rank					Average Rank Score	Number of Respondents
	1 (Most Important)	2	3	4	5 (Least Important)		
I. Continental, Classical, and Comparative Literature	0	2	4	5	30	4.5	41
II. Literature to 1660	17	9	4	8	1	2.1	39
III. English Literature 1660-1914	17	14	7	1	0	1.8	39
IV. American Literature before World War I	2	7	18	14	1	3.1	42
V. British and American Literature Since 1914	6	8	8	12	6	3.1	40

Information in Table 7 indicates that the respondents believe that content topics II and III should have the greatest emphasis and should have equal emphasis. Topics IV and V should have the next greatest emphasis and should have equal emphasis. Topic I should have the least emphasis. The content specifications for the Advanced Literature in English Test indicate that topics II and III should have the greatest emphasis with topic III having a slight edge over topic II. Topic V should be next in emphasis and topics IV and I should have the least emphasis with IV having slightly more than I. This seems to suggest that to bring the specifications into conformance with the emphasis accorded topics in undergraduate curricula, more emphasis should be given to topic IV, American literature before World War I, and less emphasis to topic V, British and American literature since 1914.

As in the Biology study, the average rank scores for the Literature in English categories cited above represent an average opinion of a diverse group of respondents. Subanalyses of the rankings of content categories for importance were made to determine whether there were recognizable differences in response among subgroups of the total sample. The rankings by respondents were compared according to the following contrasting variables:

1. Respondents with a primary interest in British literature vs those with a primary interest in American literature
2. Respondents with a primary interest in modern (twentieth century) literature vs those with a primary interest in early (pretwentieth century) literature
3. Respondents having less than 15 years of teaching experience vs those having 15 years or more of teaching experience
4. Respondents from institutions with student bodies of less than 10,000 vs those from institutions with student bodies of 10,000 or more
5. Respondents teaching at institutions with undergraduate programs only vs those teaching at institutions with both undergraduate and graduate programs
6. Respondents from institutions in the Northeast vs those from institutions in the Midwest vs those from institutions in the South vs those from institutions in the West

Once again, the rank ordering of content topics is essentially the same as that for the total sample regardless of the subgroup studied. In addition, the differences in average rank score for the categories for the contrasts are very small. As an example, the contrast among subgroups by region of the country is provided below in Table 8. These data are presented because the differences between average rank scores are greater for this contrast than for any of the others. Although the numbers in these subgroups are small, again it can be inferred that the emphasis given to various topics in the field of English literature is reasonably standard and is independent of the personal inclinations of the respondent or the physical characteristics of the institution.

Table 8: Summary of rank ordering of the Advanced Literature in English Test content categories according to their importance in undergraduate curricula - average rank scores by region.

Content Categories	Region	Average Rank Score	Number of Respondents
I. Continental, Classical, and Comparative Literature	NE	4.5	12
	MW	4.5	15
	S	4.6	9
	W	4.3	7
II. Literature to 1660	NE	2.5	12
	MW	2.0	15
	S	1.9	9
	W	2.7	7
III. English Literature 1660-1914	NE	1.7	12
	MW	1.7	15
	S	2.4	9
	W	1.8	7
IV. American Literature before World War I	NE	3.4	12
	MW	2.6	15
	S	3.5	9
	W	3.1	7
V. British and American Literature Since 1914	NE	3.0	12
	MW	3.4	15
	S	2.0	9
	W	3.1	7

The data presented in Table 9 are derived from the content specifications for the Advanced Literature in English Test and from the second questionnaire, which was intended to indicate the amount of agreement on the classification of individual questions according to the content topics in the specifications. The data in the second column of this table are derived by assigning a question to the content category or categories to which 50 percent or more of the respondents believed it belonged. (The percentages in this column do not sum to 100 percent because respondents often assigned questions to more than one category.) The data in the second column are based upon a maximum of 15 respondents per questions.

Table 9: Content emphasis by content categories in the Advanced Literature in English Test

Content Category	Percentage of Test According to Specifications	Percentage of Test Based on Respondents' Classifications of Questions
I Continental, Classical, and Comparative Literature	5-10%	13%
II Literature to 1660	25-35%	25%
III English Literature 1660-1914	30-40%	33%
IV American Literature before World War I	10%	11%
V British and American Literature Since 1914	20-25%	26%

These data indicate that the emphasis on content topics actually in the test is very close to that specified for the test.

Since the historical categorization of topics is broad and all-inclusive, it was anticipated that no additional topics would be suggested by respondents and none were. Alternative systems of classification were suggested by a few respondents, but the historical method of categorizing literature is the method used in course offerings and lists of requirements at most institutions and the majority of the respondents were satisfied with it.

Because the historical groupings used in the specifications are all-inclusive and straightforward, most of the respondents found the task of classifying questions in a recent test form by these categories to be trivial. The Committee of Examiners for the Advanced Literature in English Test normally delegates the task of classifying the test questions to the test specialists since, with adequate time and references, there can be little debate over the proper classification of the questions. On only 2 questions out of the 230 classified was there less than 50 percent agreement from the respondents with the test specialist's classification, and, on 97 percent of the items, there was at least 70 percent agreement from the respondents with the test specialist's classification. The percentage of agreement by category between the test specialist's classification and the classifications provided by the respondents is indicated in Table 10.

Table 10: Comparison of test specialist's content classification of questions with that provided by respondents for the GRE Advanced Literature in English test

Content Category	Percentage of questions for which 50% or more of the respondents agreed with the test specialist's classification.
I. Continental, Classical, and Comparative Literature	73%
II. Literature to 1660	91%
III. English Literature 1660-1914	92%
IV. American Literature before World War I	85%
V. British and American Literature Since 1914	87%

The amount of disagreement indicated by these data is somewhat misleading since the test specialist often classifies a question in two or more categories whereas the respondents generally reported only one of the several possibilities. Nevertheless, the percentage of agreement seems to be reasonably high.

In summation, the data from these questionnaires indicate that the content topics in the specifications for the Advanced Literature in English Test provide an appropriate description of the topics covered in undergraduate curricula in Literature in English and that the questions intended to cover these topics do indeed cover them. The data also indicate that a slight shift in emphasis on two of the topics should be investigated, but the alteration needed, if any, is small. These facts all tend to support the assertion that the content of this test is reasonably representative of that taught in undergraduate curricula.

The Advanced Political Science Test Study

The Advanced Political Science Test study involved the fewest respondents of the three studies, but, within the limitations of the study due to the small number of respondents, evidence that the content of the test is representative of that taught in undergraduate curricula was found. The first questionnaire was designed to determine the importance in undergraduate curricula of the content topics used in assembling this test. From Table 11, it can be seen that, in all but one case, a majority of the respondents believed the major content topics to be quite important in their undergraduate curricula.

Table 11: Importance of content categories as preparation for graduate study in political science

Topic	Very or Moderately Important	Minimally Important or Unimportant
I. United States Government	100%	
II. Comparative Political System	94%	6%
III. International Relations	94%	6%
IV. History of Political Thought	84%	16%
V. Applied Theory	47%	54%
VI. Methodology	56%	44%

Number of respondents = 32

These data indicate that four of the six content topics in the specifications for the Advanced Political Science Test are judged to be quite important in the respondents' undergraduate curricula leading to graduate study in political science. The respondents were split evenly on their estimations of importance of categories V and VI, applied theory and methodology.

The respondents were asked to suggest additional content topics that are important in their curricula. Several topics were suggested, but none of these emerged as important to more than one or two of the respondents.

The first questionnaire also asked the respondents to rank the content topics on a scale from 1 (most important) to 6 (least important) according to the importance of the topics in the respondents' curricula. An average rank score was then calculated for each content topic by multiplying the number of respondents choosing each rank for a particular topic by the rank, summing these products across a topic, and dividing by the number of respondents. The average rank score for each topic is presented in Table 12 along with an indication of the number of respondents choosing each rank. The lower the average rank score, the more important the respondents believed the topic to be.

Table 12: Summary of rank ordering of content categories according to their importance in undergraduate political science curricula - Number of respondents choosing each rank

Content Categories	Rank						Average Rank Score	Number of Respondents
	1 (Most Important)	2	3	4	5	6 (Least Important)		
I. United States Government	23	4	1	0	0	0	1.2	28
II. Comparative Political Systems	2	8	11	5	1	1	2.9	28
III. International Relations	0	10	10	7	1	0	3.0	28
IV. History of Political Thought	3	7	1	14	0	3	3.4	28
V. Applied Theory	0	1	2	2	14	8	5.0	27
VI. Methodology	0	0	1	3	12	10	5.2	26

These data reveal that the respondents believe that content topic I should have the greatest emphasis, that content topics II, III, and IV should have equal emphasis, but less than topic I, and that content topics V and VI should have the least emphasis and the emphasis on each should be the same. The emphasis that each topic has actually received in four recent forms of the Advanced Political Science Test was somewhat different. In these forms topic I received the greatest emphasis, topic II received the second greatest emphasis, and the emphasis on the remaining four topics was equal and less than either of the first two. This suggests that for this test to be brought into conformance with the respondents' report of undergraduate curricula, emphasis on topics III and IV, international relations and history of political thought, should be increased at the expense of topics V and VI, applied theory and methodology.

Again in this study, the average rank scores for the Advanced Political Science Test content categories are an average response of a diverse group. Subanalyses of the rankings by importance of content categories were made to determine whether or not differences in response existed among subgroups of the total sample. The rankings by respondents were compared according to the following contrasting variables:

1. Respondents expressing a primary interest in domestic affairs vs those expressing a primary interest in comparative political systems
2. Respondents having less than 15 years of teaching experience vs those having 15 years or more of teaching experience
3. Respondents from institutions with student bodies of less than 10,000 vs those from institutions with student bodies of 10,000 or more
4. Respondents teaching at institutions with undergraduate programs only vs those teaching at institutions with both undergraduate and graduate programs
5. Respondents from institutions in the Northeast vs those from institutions in the Midwest vs those from institutions in the South vs those from institutions in the West

As in the other two studies, the rank ordering of content topics by any subgroup is virtually identical with that by the total group. The differences in the average rank score for the content topics in each of the contrasts are very small. As in the two studies reported previously, the largest differences in average rank scores for content topics occurred in the contrasts among the respondents from different regions of the country. The data on these contrasts are presented in Table 13 as evidence of the consistency in responses. From these data, it can be inferred that the emphasis given to the various political science topics included in the specifications for the GRE Advanced Political Science Test is reasonably standard and is independent of the characteristics of either the respondents or the institutions they represent.

Table 13: Summary of rank ordering of political science content categories according to their importance in undergraduate curricula - Average rank score by region.

Content Categories	Region	Rank Score	Number of Respondents
I. United States Government	NE	1.0	3
	MW	1.6	7
	S	1.3	10
	W	1.0	8
II. Comparative Political Systems	NE	2.7	3
	MW	3.0	7
	S	3.0	10
	W	3.0	8
III. International Relations	NE	3.0	3
	MW	2.8	7
	S	3.0	10
	W	3.1	8
IV. History of Political Thought	NE	3.3	3
	MW	3.6	7
	S	3.7	10
	W	2.9	8
V. Applied Theory	NE	5.2	3
	MW	4.9	7
	S	5.0	10
	W	5.4	8

The data in Table 14 are derived from the actual content of the last four forms of the test as classified by the test specialists and from the second questionnaire, which was intended to indicate the amount of agreement on the classification of individual questions by the content topics in the specifications. The data in the second column of this table were derived by assigning a question to the content category or categories to which 50 percent or more of the respondents believed it belonged. (The percentages in this column do not sum to 100 percent because, on some questions, agreement was less than 50 percent for any of the content topics proposed.) The data are based upon a maximum of 12 respondents per question.

Table 14: Content emphasis by topics in the Advanced Political Science Test

Topic	Percentage of Test According to Specifications	Percentage of Test Based on Respondents' Classifications of Questions
I. United States Government	34%	46%
II. Comparative Political Systems	22%	15%
III. International Relations	12%	12%
IV. History of Political Thought	10%	12%
V. Applied Theory	12%	4%
VI. Methodology	10%	4%

It is clear from these data that the respondents believed the test to be somewhat different from what was intended by the test specialists. Curiously, when the respondents' classifications of questions by content categories are considered along with their report of undergraduate content emphasis (see Tables 12 and 14), it appears that the test actually does have the appropriate emphasis. Thus, whereas the specifications may need realignment or the description of the content topics in the specifications may need more detail, the actual makeup of the test seems appropriate. It must be realized, however, that the data that support the latter conclusion are based upon sample sizes as low as nine respondents and caution should be exercised in accepting these results as reliable. Nevertheless, these data are encouraging evidence that the content of this test does indeed represent what is taught in undergraduate curricula.

The second questionnaire asked the respondents to classify a portion of the questions in a recent form of the test by the major and minor content categories found in the specifications. The results of this activity were compared to the classification assigned to questions by the Committee of Examiners and the test specialist for this test. On 88 percent of the questions, 50 percent or more of the respondents agreed with the committee and test specialist categorization by major topic and 81 percent agreement was found on two-thirds of the questions. On only 4 percent of the questions was there total disagreement with the committee and test specialist classification. Many of the most serious differences involved classifications V and VI, where overlap with other topics was recognized. The classification by subtopic was less parallel, however, possibly reflecting extensive overlap among the subtopics. The percentage of agreement by content category between the test committee and test specialist major classifications and the classifications submitted by respondents is reported in Table 15.

Table 15: Comparison of committee and test specialist major content classification of questions with that provided by respondents for the GRE Advanced Political Science Test

<u>Content Category</u>	<u>Percentage of questions for which 50% or more of the respondents agreed with the committee and test specialist major classification</u>
I. United States Government	99%
II. Comparative Political Systems	90%
III. International Relations	81%
IV. History of Political Thought	69%
V. Applied Theory	40%
VI. Methodology	75%

These data indicate that, for the first four topics, the respondents agreed with the committee and test specialist classification. The content of topics V and VI, applied theory and methodology, necessitate some overlap among these categories and the first four. Such overlap accounts for the relatively low agreement on questions belonging to these categories. Most of the respondents classified questions in only one category and therefore had to choose between the methodology or applied theory category and the content used as the vehicle to test these categories. The percentage of agreement on questions belonging to these two categories might be improved by asking respondents to classify questions in as many ways as possible.

In summation, the respondents to this study found that the topics in the specifications for the Advanced Political Science Test are those that are most important in their undergraduate curricula, but that the intended emphasis on each topic is not quite parallel to the emphasis given each topic in their curricula. Responses to the question classification task indicate that the actual content of the test as assigned by the respondents is very closely aligned with the emphasis that the respondents indicate to be appropriate. This seems to suggest that the classification scheme is imperfect, an assertion substantiated by the results of the second questionnaire. These shortcomings notwithstanding, this study does in general provide evidence that the test content is reasonably representative of that taught in undergraduate political science curricula.

5. Summary and Recommendations

The purpose of this study was to determine the degree to which the content of the GRE Advanced Biology, Literature in English, and Political Science Tests represents that being taught in the associated undergraduate curricula by providing evidence, first, that the content specifications that guide the development of these tests reflect the content topics and the emphasis given to each topic in most undergraduate curricula, and, second, that the questions in the test actually test the topics they are intended to test. The study of the Advanced Literature in English Test revealed that, for the most part, the emphasis given to each of the major topics parallels what the study respondents believed to be appropriate. Since these respondents were asked to answer the questionnaires on the basis of their departments' curricula leading to graduate study, and since the respondents were selected to comprise a broad sample of American departments of English literature, it can be inferred that the emphasis given to the major content areas in the test specifications does indeed accurately represent what is currently required by many, if not most, United States colleges.

The studies of the Advanced Political Science and Biology Tests, however, reveal that the emphasis on content in the specifications for these tests is not completely paralleled by the emphasis prescribed in current curricula leading to graduate study. The consensus of the respondents in the Advanced Biology Test study was that more emphasis should be placed on the topic of cellular biology and less on physiology and morphology. The emphasis placed on the remaining categories by the specifications for this test seems to match the level of emphasis the topics are given in current curricula. This information, along with the individual comments and recommendations of the respondents, has been made available to the GRE Advanced Biology Test Committee of Examiners. This is information members of the biology committee had been seeking for some time to help them in their proposed revision of the test specifications.

The Advanced Political Science Test study also indicated that the emphasis on certain content topics in the test is not completely parallel to that placed on these topics in the current curricula. If the Committee of Examiners for this test wishes to bring the content emphasis in this test into better alignment with the emphasis that the respondents indicate is found in current curricula, it will need to increase the emphasis on the topics of international relations and history of political thought.

In each of the three studies, the classification of questions by content topics provided by ETS staff and Committees of Examiners was found to be reasonably consistent with the classifications provided by the study respondents. Where significant disagreement exists, the Committees of Examiners may wish to review possible explanations for the divergence and attempt to improve the rigor with which classifications are made or defined.

Each of the studies described in this report provide evidence that the content of the tests does represent what is being taught in

the undergraduate curricula according to the criteria described previously. The Committees of Examiners for the tests, however, may wish to consider some modifications to their existing specifications and/or classification schemes that might result in still greater agreement with undergraduate curricula.

Comparisons were made of the curricula espoused by specific subgroupings of the total sample of respondents for each test. These comparisons indicated remarkable conformity among the curricula offered by the institutions included in the sample. The implication of such a finding is that the GRE test, which is aimed at the "average curriculum" in the field, is an appropriate test for the students in a large percentage of the institutions in the United States. Whether this finding will hold up if sample sizes are increased or if different criteria are used to choose institutions remains to be seen, but it is, nevertheless, an encouraging result.

The response to these studies was encouraging. Apparently schools and departments that use the GRE Advanced Tests, and even some that do not, were interested enough in the meaning of the tests to take the time to help establish the validity of their content.

The three studies described in this report were based upon relatively small samples of institutions ranging from 32 for the Advanced Political Science Test to 48 for the Advanced Biology Test. Such numbers must necessarily limit the generalizability of the findings to some extent. It was realized that definitive conclusions about test content representativeness could not be made on the basis of such small samples. Nevertheless, it seemed likely that valuable information concerning test content would be obtained. Almost certainly, if any one of the tests had been substantially out of step with the undergraduate curricula, this small-scale survey would have revealed the fact. For example, if the Biology Test had been concerned with only one subarea of the field instead of the entire field of biology, the respondents would certainly have pointed that out.

Confidence in the findings could be increased to some degree by increasing the size of the sample. This might be done in three ways -- by questioning more members of the departments that agree to participate in the study, by including more institutions in the study, or both. The first method would increase the confidence that reasonably could be placed in institutional responses. The second method would provide more assurance that the criterion against which the test is being measured accurately reflects the general undergraduate curricula. Of course, a combination of these methods would have both virtues. The only disadvantage anticipated is associated with the first method. It is possible that a decrease in the willingness of department chairpersons to participate might result if they must identify more than one respondent. If funding is available, however, it is recommended that both methods be pursued.

In general, the study supplies substantial evidence for the representativeness of the content of the three tests. Obviously, the strength of the correspondence between test content and undergraduate curriculum varies from school to school. Although the respondents generally agreed that test content was appropriate, there were disagreements with the emphasis given to certain subareas for two of the tests. The Committees of Examiners for the two tests will examine the results in detail and determine, from all the information available to them, whether changes in test specifications seem appropriate.

Content Validity Study--GRE Advanced Literature in English Test

I. Importance of content categories as preparation for graduate studies

Name _____

Institution _____

The categories given in the chart below provide one means of classifying the content of the GRE Advanced Literature in English Test. Please indicate the importance of each of these categories in the undergraduate curriculum that your department generally recommends as preparation for those who intend to pursue graduate study in English by: (1) placing a mark under the appropriate descriptive word or phrase (Very Important, etc.)--you may find that you do not wish to use some descriptions and that you wish to use others more than once--and (2) ranking the categories by entering the numerals 1 (most important) through 5 (least important) in the column headed "Rank" (use each numeral only once). Although the responses obtained by these two means of description will doubtlessly be closely related, we hope each will provide us with a slightly different perspective on your reactions.

Please read the "Supplemental Description of "Categories" on the next page before responding.

CATEGORIES	Importance in curriculum recommended as preparation for graduate study in English (check one for each category)				Rank (1-5)
	Very Important	Moderately Important	Minimally Important	Unimportant	
Continental, Classical & Comparative Literature					
Literature to 1660					
English Literature 1660-1914					
American Literature Before World War I					
British and American Literature Since 1914					

Supplemental Description of Categories

Continental, Classical, and Comparative Literature:

Includes such material as mythology, Greek and Roman literature, Continental drama and fiction, and Continental sources.

Literature to 1660:

Includes Old English, Middle English, the Renaissance, Jacobean, and Cavalier periods, and, somewhat arbitrarily, Milton.

English Literature 1660-1914:

Includes Restoration and Eighteenth-Century literature, Romanticism, and Victorianism. (Henry James is included in American Literature; Conrad and Forster in British and American Literature since 1914.)

American Literature Before World War I:

Includes American literature from its beginnings to the First World War. (Henry James is included in this category.)

British and American Literature Since 1914:

The date 1914 is rather loosely interpreted, and this category includes figures such as Conrad and Forster, some of whose work may have appeared somewhat earlier.

Content Validity Study—GRE Advanced Literature in English Test

II. Content classification of questions

Name _____

Institution _____

The list that appears on the following pages provides an opportunity for you to classify about fifty questions (or more if you wish) from the enclosed version of the GRE Advanced Literature in English Test. For each question, choose the content category in which you believe the question should be placed and indicate your classification by placing a check mark in the appropriate box below the question number. If you feel that the question could properly be classified in more than one category, place a check mark in as many boxes as necessary. The categories are the same as those employed in section I of the questionnaire, and the definitions of the categories stipulated there apply to this section as well.

In order to minimize the time that each respondent need spend in completing this section of the questionnaire, we are asking different respondents to classify different groups of about fifty questions each. The questions we would like you to classify are those listed on the page that immediately follows this one. If you care to devote additional time to this study, go on to classify as many as you wish of the questions listed on subsequent pages.

II. Content Classification of Items

CATEGORIES	- - - Q U E S T I O N S - - -																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Continental, Classical & Comparative Literature																							
Literature to 1660																							
English Literature 1660-1914																							
American Literature Before World War I																							
British & American Literature Since 1914																							
CATEGORIES	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46
Continental, Classical & Comparative Literature																							
Literature to 1660																							
English Literature 1660-1914																							
American Literature Before World War I																							
British & American Literature Since 1914																							

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APPENDIX A

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CONTENT VALIDITY STUDY - GRE ADVANCED LITERATURE IN ENGLISH TEST

III. Background Information Questionnaire

1. Name _____
2. Academic Rank (e.g., Associate Professor) _____
3. Administrative Responsibility (e.g., Department Chairperson) _____
4. Official Name of your Department (e.g., Department of English Language and Literature) _____
5. Institution _____
6. Your specialty or area of primary interest. (Enter "1," "2," and "3" for first, second, and third choices. Make only three entries.)
 - () British literature before 1500
 - () Renaissance British literature
 - () Restoration and Eighteenth-Century British literature
 - () British Romantic literature
 - () British Victorian literature
 - () American literature before the Civil War
 - () American literature from the Civil War to World War I
 - () Twentieth-Century British and American literature
 - () Continental and/or classical literature
 - () Critical theory
 - () Minority or ethnic literature
 - () Composition
 - () Creative Writing
 - () Linguistics
 - () Other (please specify) _____
 - () Other (please specify) _____
 - () Other (please specify) _____
7. Years of experience teaching English at the college level. _____
8. Year in which you received your highest earned degree. _____
9. Your average teaching load (number of contact hours per week) during the past five years (or since you started teaching if you have been teaching fewer than five years). _____
10. Approximate number of graduate dissertations you have directed during the past five years, if any. _____

Content Validity Study - GRE Advanced Biology Test

I. Importance of content categories in undergraduate Biological Sciences curriculum

BIOLOGICAL SCIENCES

Name _____

Institution _____

The categories given in the chart below provide one means of classifying the content of the GRE Advanced Biology Test. Please indicate the importance of each of these categories in the undergraduate curriculum that your department generally recommends as preparation for those who intend to pursue graduate study in Biology by: (1) placing a mark under the appropriate descriptive word or phrase (Very Important, etc.)--you may find that you do not wish to use some descriptions and that you wish to use others more than once-- and (2) ranking the categories by entering the numerals 1 (most important) through 6 (least important) in the column headed "Rank" (use each numeral only once). Although the responses obtained by these two means of description will doubtlessly be closely related, we hope each will provide us with a slightly different perspective on your reactions.

Please read the "Supplemental Description of Categories" on the next page before responding.

Importance of inclusion in undergraduate Biological Sciences curriculum (check one for each category)					
Categories	Very Important	Moderately Important	Minimally Important	Unimportant	Rank (1-6)
I Molecular-Subcellular Biology					
II Cellular Biology					
III Physiology and Morphology					
IV Developmental and Comparative Biology					
V Environment					
VI Evolution		38			

SUPPLEMENTAL DESCRIPTION OF CONTENT CATEGORIES

Category I (Molecular-Subcellular Biology)

Includes all questions that deal with structure and function of sub-units of the cell, including structures such as cell organelles and viruses, DNA and RNA synthesis, coding, gene regulation, molecular evolution, and the biochemical basis of metabolism.

Sample Questions:

1. In the replication of DNA, which of the following has been demonstrated experimentally?
2. Genetic coding of a complete protein is provided by a single molecule of which of the following?
3. Which of the following reactions would be expected to show the largest entropy change?
4. The biocatalysts of reactions in living systems are most appropriately characterized as

Category II (Cellular Biology)

Includes features usually associated with the whole cell, such as cellular metabolism, carbon fixation in photosynthesis, biochemistry of the whole cell, cell division, and functional organization of prokaryotic and eukaryotic cells.

Sample Questions:

1. The process of osmosis in living plant cells includes all of the following EXCEPT
2. Which of the following is a single cell?
3. Which of the following is NOT associated with cell division in plants?
4. Which of the following is a characteristic of prokaryotes?

Category III (Physiology and Morphology)

Includes all those life processes maintaining homeostasis of the individual organism. Included are physiologic functions, morphology, and anatomy of plants and animals.

Sample Questions:

1. In the human female, the site of union of sperm and egg is usually the
2. Digestion in a mammal is essentially a process of
3. The plant hormone indoleacetic acid has the greatest effect upon which of the following processes?
4. Injection of epinephrine into a human will cause all of the following symptoms EXCEPT

Category IV (Developmental and Comparative Biology)

Includes processes by which an entire organism develops and relates to its surroundings. Included are behavior, genetics and inheritance, developmental processes, and comparative biology.

Sample Questions:

1. Neural crest cells give rise to
2. In contrast to the central nervous system of vertebrates, the central nervous system of insects is
3. If the parents of a child were blood type O and A, the child would be blood type
4. When a nucleus from an adult frog is transplanted into a newly fertilized frog's egg, which of the following occurs?

Category V (Environment)

Ecology in the broadest sense including such topics as physical and biological factors related to distribution, biomes, ecosystems, community structure and energetics, population dynamics and regulation.

Sample Questions:

1. Which of the following is NOT characteristic of ecological succession?
2. Which of the following ecosystems has been shown experimentally to be most sensitive to ionizing radiation?
3. At the same latitude, which of the following would exhibit the greatest transpiration rate per acre?
4. As energy flows from producers through herbivores to consumers, there is usually

Category VI (Evolution)

Evolution in the several senses of phylogeny, speciation, the genetic basis of selection, and adaptation.

Sample Questions:

1. Which of the following fossil men most closely resembles modern man?
2. The wings of a dove and the wings of a grasshopper are
3. Which of the following phyla contain the greatest number of living species?
4. If the frequency of red flowers in a population is 36% and the frequency of white flowers is 64% and red color is dominant over white, what is the frequency of the dominant gene in the population?

Please estimate and enter below the percentage of items in each content category you believe would be appropriate if the test were to properly assess the undergraduate Biological Sciences curriculum as it currently exists at your institution. Please list any additional content categories you feel are important elements in the undergraduate Biological Sciences curriculum at your institution, and enter the appropriate percentage for each. (Your entries should total 100%.)

<u>Content Category</u>	<u>Appropriate Percentage of Items in Test (please enter)</u>
Molecular-Subcellular Biology	_____
Cellular Biology	_____
Physiology and Morphology	_____
Developmental and Comparative Biology	_____
Environment	_____
Evolution	_____
Other (describe):	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

Total: 100%

CATEGORIES	---QUESTIONS---																										
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	
I. Molecular-Subcellular																											
II. Cellular																											
III. Physiology & Morphology																											
IV. Developmental & Comparative																											
V. Environment																											
VI. Evolution																											-36-
CATEGORIES	97	98	99	100	101	102	103	104	105	106	107	108	109	110	166	167	168	169	170	171	172	173	174	175	176	177	178
I. Molecular-Subcellular																											
II. Cellular																											
III. Physiology & Morphology																											APPENDIX A
IV. Developmental & Comparative																											
V. Environment																											43
VI. Evolution																											

OPTIONAL

Forms for classifying additional questions ONLY if you wish
to spend EXTRA TIME.

Questionnaire I

RELATIONSHIPS OF THE CONTENT OF THE TEST TO UNDERGRADUATE
STUDY IN POLITICAL SCIENCE

Name _____

Institution _____

Below is one way of categorizing the content of the GRE Advanced Political Science Test. Please indicate, for each category, the degree to which it is included in the undergraduate Political Science curriculum of your institution. After you have rated each category, please rank the categories by entering the numerals 1 (most important) through 5 (least important) in the column headed "Rank". (Use each numeral only once.)

Please read the "Supplemental Description of Categories" on page 2 before responding.

Category*	Importance of inclusion in undergraduate curriculum (check one for each category)				Rank (enter)
	Very Important	Moderately Important	Minimally Important	Unimportant	
I United States Government					
II Comparative Political Systems					
III International Relations					
IV History of Political Thought					
V Applied Theory					
VI Methodology					

Other (specify and check importance but do not rank):

* See "Supplemental Description of Categories" on page 2.

Supplemental Description of Categories

I. United States Government

The questions included in this category measure a candidate's awareness and understanding of the purpose, structure, and operation of important United States political institutions, organizations, and groups at the national, state, and local levels. Some questions involve both knowledge and understanding of the processes by which voter and other political attitudes become established and the interaction between public opinion and political decision making.

II. Comparative Political Systems

Questions included in this category measure candidate awareness and understanding of the goals, structure, organization, and operation of major political systems. In addition, they require a general knowledge of problems connected with political modernization, of important similarities and differences between political systems, and of the interaction between political forces and movements across national boundaries.

III. International Relations

The questions in this category require candidate awareness and understanding of the following: (1) the goals, structure, and operation of important international political institutions, (2) significant and relevant aspects of international law, (3) factors influencing the foreign policy of major nations and power blocs, and (4) the influence on international relations of global problems and movements; e.g., conservationism, terrorism.

IV. History of Political Thought

The questions in this category test candidate understanding of the theories of major Western and non-Western political theorists and ideologists.

V. Applied Theory

The questions in this category measure candidate awareness of the influence of major political theories and ideologies on the development of modern political institutions, attitudes, goals, etc.

VI. Methodology

The questions in this category measure candidate knowledge and understanding of political science methodologies, and the ability to apply them in sub-areas of the content domain ranging from United States Government to International Relations.

Questionnaire II

Attached to this questionnaire you will find a recent form of the GRE Advanced Political Science Test and the Content Specifications for the test. Complete the form below by indicating the content area for those items that have been asterisked. If you would like to classify all the items in the test, space has been provided for that as well. If you encountered any difficulty in classifying any item according to the test specifications, enter your comments in the space provided. Item Number 1 has been done for you as an example.

Item Number	Content Specifications Category	Comments
1	IIc	
* 2		
3		
4		
* 5		
6		
7		
* 8		
9		
10		

Questionnaire III

APPENDIX A

BACKGROUND INFORMATION QUESTIONNAIRE
POLITICAL SCIENCE

1. Name _____
2. Academic Rank (e.g., Associate Professor) _____
3. Administrative Responsibility (e.g., Department Chairperson) _____

4. Department _____
5. Institution _____
6. General Area of Interest

 - () United States Government and Politics
 - () Comparative Political Systems
 - () International Relations
 - () History of Political Thought
 - () Applied Theory
 - () Methodology
 - () Other (please specify) _____
 - () Other (please specify) _____
7. Years of experience teaching Political Science at college level. _____
8. Average number of hours per week devoted to teaching (including class time, preparation, and advising) during the past five years (or less if you have been teaching less than five years). _____
9. What level of students do you primarily teach?
(check one)
 - () graduate
 - () undergraduate
 - () both
 - () not applicable
10. Please list three living eminent educators or scholars in the field of Political Science whose opinions regarding the content of the GRE Advanced Political Science Test you would value.

11. If your institution accepts graduate students in Political Science, what is the policy of your institution regarding the use of scores from the GRE Advanced Political Science Test in the selection of those students for admission? (check one)
- A. ☐ Scores are required for all applicants
 - B. ☐ Scores are used for some, but not all, applicants
 - C. ☐ Scores are not required
 - D. ☐ Don't know

APPENDIX B

Parent Institutions of Study Participants

I. Biology

1. University of Alabama in Birmingham
2. University of Arizona
3. Arkansas State University
4. California Institute of Technology
5. University of California at Los Angeles
6. University of California at Santa Barbara
7. University of Denver
8. University of Connecticut
9. University of Florida at Gainesville
10. Emory University
11. Idaho State University
12. Illinois State University
13. Loyola University of Chicago
14. Purdue University
15. Grinnell College
16. University of Northern Iowa
17. Kansas State University at Manhattan
18. University of Louisville
19. Grambling State University
20. Tulane University
21. Johns Hopkins University
22. Boston University
23. Southeastern Massachusetts University
24. Tufts University
25. Northern Michigan University
26. Carleton College
27. University of Minnesota
28. University of Mississippi
29. Washington University
30. Montana State University
31. Creighton University
32. University of Nebraska at Omaha
33. University of Nevada at Reno
34. Cornell University
35. Adelphi University
36. SUNY at Binghamton
37. University of Rochester
38. Wilberforce University
39. Case Western Reserve University
40. Ohio University
41. University of Oregon
42. Pennsylvania State University
43. Providence College
44. Winthrop College
45. University of South Carolina at Columbia
46. Elmhurst College
47. Luther College
48. Gettysburg College

II. Literature in English

1. DePaul University
2. University of Cincinnati
3. Kenyon College
4. University of Wisconsin
5. University of Nebraska
6. Bowdoin College
7. Carleton College
8. Davidson College
9. University of Michigan
10. SUNY at Binghamton
11. University of Chicago
12. Vanderbilt University
13. Grinnell College
14. Smith College
15. University of Santa Clara
16. Upsala College
17. Purdue University
18. Grambling State University
19. University of Alabama
20. University of Mississippi
21. University of California at Davis
22. University of Oregon
23. Indiana University
24. College of the Holy Cross
25. Emory University
26. Rhode Island College
27. Yale University
28. Hofstra University
29. Brandeis University
30. Baylor University
31. Washington University at St. Louis
32. Creighton University
33. College of William and Mary
34. University of New Mexico
35. University of Florida at Gainesville
36. Oberlin College
37. University of Notre Dame
38. Brigham Young University
39. Tulane University
40. Rice University
41. Lewis and Clark College
42. Temple University
43. University of Arizona at Tucson

III. Political Science

1. American University
2. Arizona State University
3. Boston University
4. Brigham Young University
5. Colgate University
6. College of Wooster
7. Duke University

8. Gettysburg College
9. Gonzaga University
10. Loyola University
11. North Georgia College
12. Northwestern University
13. Miles College
14. Old Dominion University
15. Portland State University
16. Stanford University
17. University of California at Los Angeles
18. University of Denver
19. University of Florida
20. University of Kansas
21. University of Kentucky
22. University of Missouri
23. University of Nevada
24. University of Puget Sound
25. University of Rhode Island
26. University of South Dakota
27. University of Texas at Austin
28. University of Vermont
29. Vanderbilt University
30. West Virginia University
31. Winona State College
32. Xavier University

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